

Compound Separation

Liquid-liquid extraction is a term used in chemical laboratory work to describe a method of separating various chemical compounds contained within biological liquids, such as blood or urine samples. Used for such purposes as medical treatment, pharmaceutical preparation, and forensic chemistry, extraction is a process whereby the compounds to be separated are transferred to a solvent liquid in a series of complicated, time-consuming steps requiring a variety of special equipment.

Looking for a simpler, easier way to separate compounds, Jet Propulsion Laboratory (JPL) developed a new one-step liquid-liquid extraction technique which sharply cuts processing time, reduces costs, and eliminates much of the equipment requirement. The technique employs disposable "extraction columns," or tubes, partially filled with an inert, water-absorbent granular matrix. Shown in the accompanying photos, these columns are now produced commercially by Analytichem International, Inc., Harbor City, California under the trade name Extube®.

In a typical extraction, a liquid sample is poured into an Extube where the filling material absorbs water and



in more sensitive analytical procedures. Below is a group of larger Chem Tube® columns, used for large volume applications in industrial and environmental analysis.

JPL's original development was undertaken as an aid to the Los Angeles Police Department, allowing more rapid detection of drugs in biological samples as part of the department's drug abuse program. NASA waived title to the invention to the California Institute of Technology (Caltech), JPL's parent organization, and Analytichem International is producing Extubes under Caltech license.